WHAT IS CLAIMED IS:

1. A three-dimensional structure forming method that forms a three-dimensional structure made of a photosensitive material on a substrate, said method comprising the steps of:

determining a film thickness of the photosensitive material necessary to form the desired three-dimensional structure;

comparing a predetermined maximum film thickness with the film thickness determined by said determining step; and

applying, when the film thickness determined by said determining step is greater than the predetermined maximum film thickness, the photosensitive material within the maximum film thickness plural times until the photosensitive material has the film thickness on the substrate.

2. A three-dimensional structure forming method according to claim 1, further comprising the steps of:

exposing, with light having an energy distribution corresponding to the desired three-dimensional structure, the photosensitive material applied by said applying step; and

developing the photosensitive material that has been exposed.

3. A three-dimensional structure forming method according to claim 2, further comprising the step of etching the substrate using the photosensitive material that has been exposed.

4. A three-dimensional structure forming method according to claim 1, wherein the substrate is an optical element.

5. A three-dimensional structure forming method according to claim 1, wherein the substrate is a mold.

6. A three-dimensional structure forming method according to claim 1, wherein the photosensitive material is made of novolac resin.

7. A three-dimensional structure forming method according to claim 1, wherein said applying step applies the photosensitive material through a solvent, and the solvent is propylene glycol monomethyl ether acetate.

8. A three-dimensional structure forming method according to claim 1, wherein the maximum film thickness is equal to or smaller than 12 μm.

9. A three-dimensional structure forming method according to claim 1, wherein the film thickness of the photosensitive material necessary to form the desired three-dimensional structure is equal to or greater than 12 μm.

10. A three-dimensional structure forming method that forms a three-dimensional structure made of a photosensitive material on a substrate, said method comprising the steps of:

applying onto the substrate photosensitive material with a first film thickness within a preset maximum film thickness; and

applying onto the photosensitive material with the first film thickness applied onto the substrate, the photosensitive material with a second film thickness within the maximum film thickness.

11. A three-dimensional structure forming method according to claim 10, further comprising the steps of:

exposing, with light having an energy distribution corresponding to the desired three-dimensional structure, the photosensitive material applied by said applying step; and

developing the photosensitive material that has been exposed.

12. A three-dimensional structure forming method according to claim 11, further comprising the step of etching the substrate using the photosensitive material that has been exposed.

13. A three-dimensional structure forming method according to claim 10, wherein the substrate is an optical element.

14. A three-dimensional structure forming method according to claim 10, wherein the substrate is a mold.

15. A three-dimensional structure forming method according to claim 10, wherein the photosensitive material is made of novolac resin.

16. A three-dimensional structure forming method according to claim 10, wherein said applying step applies the photosensitive material through a solvent, and the solvent is propylene glycol monomethyl ether acetate.

17. A three-dimensional structure forming method according to claim 10, wherein the maximum film thickness is equal to or smaller than 12 μm.

18. A three-dimensional structure forming method that forms a three-dimensional structure made of a photosensitive material on a substrate, said method comprising the steps of repetitively applying and baking a photosensitive material, and forming the photosensitive material with a predetermined thickness on the substrate through overlapping applications.

19. A three-dimensional structure forming method according to claim 18, further comprising the steps of:

exposing, with light having an energy distribution corresponding to the desired three-dimensional structure, the photosensitive material applied by said applying step; and

developing the photosensitive material that has been exposed.

20. A three-dimensional structure forming method according to claim 19, further comprising the step of etching the substrate using the photosensitive material that has been exposed.

21. A three-dimensional structure forming method according to claim 18, wherein the substrate is an optical element.

22. A three-dimensional structure forming method according to claim 18, wherein the substrate is a mold.

23. A three-dimensional structure forming method according to claim 18, wherein the photosensitive material is made of novolac resin.

24. A three-dimensional structure forming method according to claim 18, wherein said applying step applies the photosensitive material through a solvent, and the solvent is propylene glycol monomethyl ether acetate.

25. An optical element manufactured by a three-dimensional structure forming method that forms a three-dimensional structure made of a photosensitive material on a substrate, said method comprising the steps of determining a film thickness of the photosensitive material necessary to form the desired three-dimensional structure, comparing a predetermined maximum film thickness with the film thickness determined by said determining step, and applying, when the film thickness determined by said determining step is greater than the predetermined maximum film thickness, the photosensitive material within the maximum film thickness plural times until the

photosensitive material has the film thickness on the substrate.

26. An optical element according to claim 25, wherein the optical element is a lens array that forms plural lenses on an array.

27. An optical element according to claim 26, wherein the plural lenses have a shape of a hexagon, an arc, or a rectangle.

28. An optical element according to claim 27, wherein the shape has a width between 12 μm and 2 mm.

29. An optical element manufactured by a three-dimensional structure forming method that forms a three-dimensional structure made of a photosensitive material on a substrate, said method comprising the steps of applying onto the substrate photosensitive material with a first film thickness within a preset maximum film thickness, and applying onto the photosensitive material with the first film thickness applied onto the substrate, the photosensitive material with a second film thickness within the maximum film thickness.

30. An optical element according to claim 29, wherein the optical element is a lens array that forms plural lenses on an array.

31. An optical element according to claim 30, wherein the plural lenses have a shape of a hexagon, an arc, or a rectangle.

32. An optical element according to claim 31, wherein the shape has a width between 12 μm and 2 mm.

33. An optical element manufactured by a three-dimensional structure forming method that forms a three-dimensional structure made of a photosensitive material on a substrate, said method comprising the steps of repetitively applying and baking a photosensitive material, and forming the photosensitive material with a predetermined thickness on the substrate through overlapping applications.

34. An optical element according to claim 33, wherein the optical element is a lens array that forms plural lenses on an array.

35. An optical element according to claim 34, wherein the plural lenses have a shape of a hexagon, an arc, or a rectangle.

36. An optical element according to claim 35, wherein the shape has a width between 12 μm and 2 mm.

37. A biochip manufactured by a three-dimensional structure forming method that forms a three-dimensional structure made of a photosensitive material on a substrate, said method comprising the steps of determining a film thickness of the photosensitive material necessary to form the desired three-dimensional structure, comparing a predetermined maximum film thickness with the film thickness determined by said determining step, and applying, when the film thickness determined by said determining step is greater than the predetermined maximum film thickness, the photosensitive material within the maximum film thickness plural times until the photosensitive material has the film thickness on the substrate.

38. A biochip manufactured by a three-dimensional structure forming method that forms a three-dimensional structure made of a photosensitive material on a substrate, said method comprising the steps of applying onto the substrate photosensitive material with a first film thickness within a preset maximum film thickness; and applying onto the photosensitive material with the first film thickness applied onto the substrate, the

photosensitive material with a second film thickness within the maximum film thickness.

39. A biochip manufactured by a three-dimensional structure forming method that forms a three-dimensional structure made of a photosensitive material on a substrate, said method comprising the steps of repetitively applying and baking a photosensitive material, and forming the photosensitive material with a predetermined thickness on the substrate through overlapping applications.

40. An optical system comprising the optical element manufactured by a three-dimensional structure forming method that forms a three-dimensional structure made of a photosensitive material on a substrate, said method comprising the steps of determining a film thickness of the photosensitive material necessary to form the desired three-dimensional structure, comparing a predetermined maximum film thickness with the film thickness determined by said determining step, and applying, when the film thickness determined by said determining step is greater than the predetermined maximum film thickness, the photosensitive material within the maximum film thickness plural times until the photosensitive material has the film thickness on the substrate.

41. An optical system comprising the optical element manufactured by a three-dimensional structure forming method that forms a three-dimensional structure made of a photosensitive material on a substrate, said method comprising the steps of applying onto the substrate photosensitive material with a first film thickness within a preset maximum film thickness, and applying onto the photosensitive material with the first film thickness applied onto the substrate, the photosensitive material with a second film thickness within the maximum film thickness.

42. An optical system comprising the optical element manufactured by a three-dimensional structure forming method that forms a three-dimensional structure made of a photosensitive material on a substrate, said method comprising the steps of repetitively applying and baking a photosensitive material, and forming the photosensitive material with a predetermined thickness on the substrate through overlapping applications.

43. An exposure apparatus comprising an optical system and exposes an object through the optical system, wherein said optical system includes the optical element manufactured by a three-dimensional structure forming method that forms a three-dimensional structure made of a photosensitive material on a

substrate, said method comprising the steps of determining a film thickness of the photosensitive material necessary to form the desired three-dimensional structure, comparing a predetermined maximum film thickness with the film thickness determined by said determining step, and applying, when the film thickness determined by said determining step is greater than the predetermined maximum film thickness, the photosensitive material within the maximum film thickness plural times until the photosensitive material has the film thickness on the substrate.

44. An exposure apparatus comprising an optical system and exposes an object through the optical system,

wherein said optical system includes the optical element manufactured by a three-dimensional structure forming method that forms a three-dimensional structure made of a photosensitive material on a substrate, said method comprising the steps of applying onto the substrate photosensitive material with a first film thickness within a preset maximum film thickness, and applying onto the photosensitive material with the first film thickness applied onto the substrate, the photosensitive material with a second film thickness within the maximum film thickness.

45. An exposure apparatus comprising an optical system and exposes an object through the optical system,

wherein said optical system includes the optical element manufactured by a three-dimensional structure forming method that forms a three-dimensional structure made of a photosensitive material on a substrate, said method comprising the steps of repetitively applying and baking a photosensitive material, and forming the photosensitive material with a predetermined thickness on the substrate through overlapping applications.

46. A device fabrication method comprising the steps of:

exposing an object using an exposure apparatus; and

developing the object that has been exposed,

wherein said exposure apparatus includes an optical system and exposes an object through the optical system, and

wherein said optical system includes the optical element manufactured by a three-dimensional structure forming method that forms a three-dimensional structure made of a photosensitive material on a substrate, said method comprising the steps of determining a film thickness of the photosensitive material necessary to form the desired three-

dimensional structure, comparing a predetermined maximum film thickness with the film thickness determined by said determining step, and applying, when the film thickness determined by said determining step is greater than the predetermined maximum film thickness, the photosensitive material within the maximum film thickness plural times until the photosensitive material has the film thickness on the substrate.

47. A device fabrication method comprising the steps of:

exposing an object using the exposure apparatus; and

developing the object that has been exposed,

wherein said exposure apparatus includes an optical system and exposes an object through the optical system, and

wherein said optical system includes the optical element manufactured by a three-dimensional structure forming method that forms a three-dimensional structure made of a photosensitive material on a substrate, said method comprising the steps of applying onto the substrate photosensitive material with a first film thickness within a preset maximum film thickness, and applying onto the photosensitive material with the first film thickness applied onto the substrate, the

photosensitive material with a second film thickness within the maximum film thickness.

48. A device fabrication method comprising the steps of:

exposing an object using the exposure apparatus; and

developing the object that has been exposed,

wherein said exposure apparatus includes an optical system and exposes an object through the optical system, and

wherein said optical system includes the optical element manufactured by a three-dimensional structure forming method that forms a three-dimensional structure made of a photosensitive material on a substrate, said method comprising the steps of repetitively applying and baking a photosensitive material, and forming the photosensitive material with a predetermined thickness on the substrate through overlapping applications.